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IN FOCUS

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The Changing Federal STEM Education Effort

Background

Policymakers have an active and enduring interest in STEM education. The topic is raised in federal science, education, workforce, national security, and immigration policy debates. Various analysts have attempted to inventory the federal STEM education effort. These inventories have identified between 105 and 254 STEM education programs and activities at 13 to 15 agencies. Annual federal appropriations for STEM education are typically in the range of about $2.8 billion to $3.4 billion. Most of these funds go to the National Science Foundation, National Institutes of Health, and the Department of Education.

> The term "STEM education" refers to teaching and learning in the fields of science, technology, engineering, and mathematics. It typically includes educational activities across all grade levels—from pre-school to post-doctorate—in both formal (e.g., classrooms) and informal (e.g., afterschool programs) settings.

Over the past several years, the Obama Administration has sought to change the federal STEM education effort through its annual budget requests. These changes received a mixed response in Congress. Some of the proposed changes were expressly adopted in appropriations bills and reports, others were rejected. Overall, it appears the number of federal programs and activities has been reduced from about 254 in FY2010 to about 114 in the FY2016 request.

Annually published inventories of the federal STEM education effort make it possible to track changes in the number of agency activities and funding levels. Less clear is the substantive effect these changes have had on agencies, programs, and the STEM education challenges and communities they were established to serve.

Reorganization

Proposed changes. In FY2014 the Obama Administration proposed a major reorganization of the federal STEM education portfolio. The proposal sought to reorganize 126 programs and activities—over half (55%) the FY2012 baseline effort (about 226)—by terminating or internally consolidating agency activities, or by transferring funds between agencies.

More proposed changes. In FY2015 the Administration proposed a second, "fresh reorganization" of the federal STEM education portfolio. That plan sought to build on changes made in FY2014 by further reducing the effort by approximately 30 more programs and activities.

And more proposed changes. The Administration's FY2016 budget request seeks further changes in the federal STEM education portfolio. The Administration has proposed eliminating 20 existing programs and establishing five new programs (compared to FY2015 enacted).

Funding stays (about) the same. Administration-requested reductions in the number of federal STEM education programs and activities were not accompanied by similarly scaled reductions in (total) Administration-requested funding for STEM education. The FY2014 request was for $3.1 billion; the FY2015 request was $2.9 billion. The FY2016 request is for $3.1 billion. FY2014 enacted and FY2015 estimated appropriations were each $2.9 billion.

Policy Analysis

Why reorganize? Some observers perceive the federal STEM education effort as fragmented or even redundant. Analysts who hold this view often see reorganization—particularly when combined with program consolidation—as an opportunity to concentrate the focus of the effort on what they perceive as priority concerns. Others look to reorganization as a means to reduce perceived duplication in the portfolio, thereby potentially increasing efficiency. Some analysts believe reorganization would contribute to better program evaluation and coordination because, they assert, a portfolio made up of a smaller number of large programs is more amenable to (1) certain types of program evaluation methods, and (2) cross-agency coordination.

Why not? A reorganization of federal STEM education programs could result in the elimination or decreased effectiveness of good or popular programs, depending on implementation. Further, one of the historical rationales for embedding small-scale STEM education activities in scientific programs—which may look like undesirable fragmentation to some observers—was the belief that this integration would increase connections between the U.S. scientific and education systems. Consolidating or reducing funding for these activities might disrupt existing networks, with unknown effects on education, research, and communities. The degree to which federal STEM education programs actually are duplicative is contested and unknown. As for evaluation, analysts debate the value of reshaping federal programs in conformance with certain types of evaluation methods, when critics say a variety of methods can be appropriate.

What Has Reorganization Done to the Federal STEM Education Effort?

It's hard to say. The qualitative effect of the various proposed reorganizations on the federal STEM education effort is unknown. These effects depend on what, when, and how changes are implemented; on the scope and scale of demand for STEM education services in the community; and on the availability of alternative sources of funding or programming. It may be many years before these effects are fully discovered and evaluated.

Trends. It is possible to track trends in the number of federal STEM education programs and activities. (See **Table 1**.) The number of programs and activities has changed substantially since FY2010, with some of the greatest reductions occurring in federal science agencies or science-focused units of federal agencies. (As opposed, for example, to the Department of Education, which is another primary source of federal STEM education funding.) It is not clear if changes in the number of activities also changed the character or substance of agency efforts. Total federal funding for STEM education ranged from $2.8 billion to $3.4 billion during the observed period; however, this general trend in funding masks (in some cases) large shifts at the agency, program, and activity level.

Table 1. Change in Federal STEM Education Programs and Activities: FY2010 to FY2016 Request
By Agency with Largest Number of Reported Programs and Activities in FY2010 Baseline Year

Agency	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015 Estimate	FY2016 Request	2010 to 2016 #	2010 to 2016 %
National Aeronautics and Space Administration	63	61	61	39	18	6	6	-57	-90%
National Science Foundation	41	41	38	32	22	21	21	-20	-49%
Department of Health and Human Services	36	36	26	24	21	19	17	-19	-53%
Department of Energy	26	22	22	21	15	17	16	-10	-38%
Department of Commerce	19	18	16	12	10	10	4	-15	-79%
Department of Agriculture	17	18	16	12	13	13	9	-8	-47%
Department of Defense	16	17	16	16	11	11	10	-6	-38%
Department of Education	14	11	12	11	12	12	13	-1	-7%
Environmental Protection Agency	8	7	7	6	7	7	5	-3	-38%
Department of Transportation	5	6	6	5	5	5	6	1	20%
Department of Homeland Security	4	3	3	3	1	1	1	-3	-75%
Nuclear Regulatory Commission	4	3	2	2	3	3	1	-3	-75%
Department of the Interior	1	4	4	3	3	3	3	2	200%
Corporation for National and Community Service	0	0	0	0	1	1	1	1	100%
Smithsonian Institution	0	0	0	0	0	0	1	1	100%
Total	**254**	**247**	**229**	**186**	**142**	**129**	**114**	**140**	**55%**

Source: CRS. Based on data from the Office of Science and Technology Policy (OSTP) and National Science and Technology Council (NSTC).

Limitations. The analysis and data reported in this In Focus are based on data from a series of published inventories of the federal STEM education effort produced by the Office of Science and Technology Policy and National Science and Technology Council. These inventories index federal STEM education "investments" (described herein as "programs and activities"). They do not align exactly with inventories that track federal agency programs or with agency budget justifications. (Other inventories, such as the index published by the Government Accountability Office in 2012, track programs but are not regularly updated.) Further, the list of investments (and funding levels) in these inventories differs from report to report. In compiling this data, CRS made certain methodological choices in order to make the data as accurate and comparable as possible. For example, if two or more inventory reports reflected different funding levels for a particular activity, CRS used the most recently reported data. Other limitations inherent to the data also apply. (See author for more information.)

Heather B. Gonzalez, hgonzalez@crs.loc.gov, 7-1895

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